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BOOKS BUILD BETTER BRAINS

HOW PROMOTING LITERACY IS KEY TO EARLY BRAIN AND CHILD DEVELOPMENT

DIPESH NAVSARIA, MPH, MSLIS, MD



DEPARTMENT OF PEDIATRICS

UW SCHOOL OF MEDICINE & PUBLIC HEALTH

SCHOOL OF LIBRARY AND INFORMATION STUDIES UNIVERSITY OF WISCONSIN-MADISON

Reach Out & Read



MEDICAL DIRECTOR, REACH OUT AND READ WISCONSIN

DISCLOSURE

I have no relevant financial relationships to disclose.

I will not discuss off-label use or investigational use in my presentation.

Although...



I don't know if "mouthing" is an FDA-approved use of board books.



Tirst, a story...

Dart One

A Stroll Through the Early Brain



American Academy of Pediatrics pedicated to the Health of All Children



© 2011 American Academy of Rediatrics

■ Implement

Planning



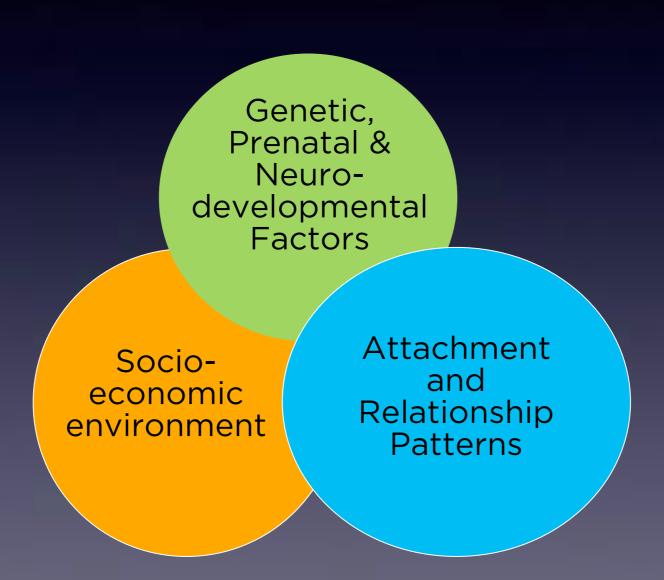
EARLY BRAIN AND CHILD DEVELOPMENT

Child development is a foundation for community development and economic development, as capable children become the foundation of a prosperous and sustainable society.

2

Brains are built over time.

The 3-legged stool for developmental and health trajectories



EARLY BRAIN AND EVELOPMENT

The interactive influences of genes and experience literally shape the architecture of the developing brain and the active ingredient is the "Serve and return" nature of children's engagement in relationships with their parents and other caregivers in their family or community.

Humans do not develop in isolation; there is a need for affiliation.

Development proceeds through and by relationships.

The Face to Face Paradigm Edward Z Tronick



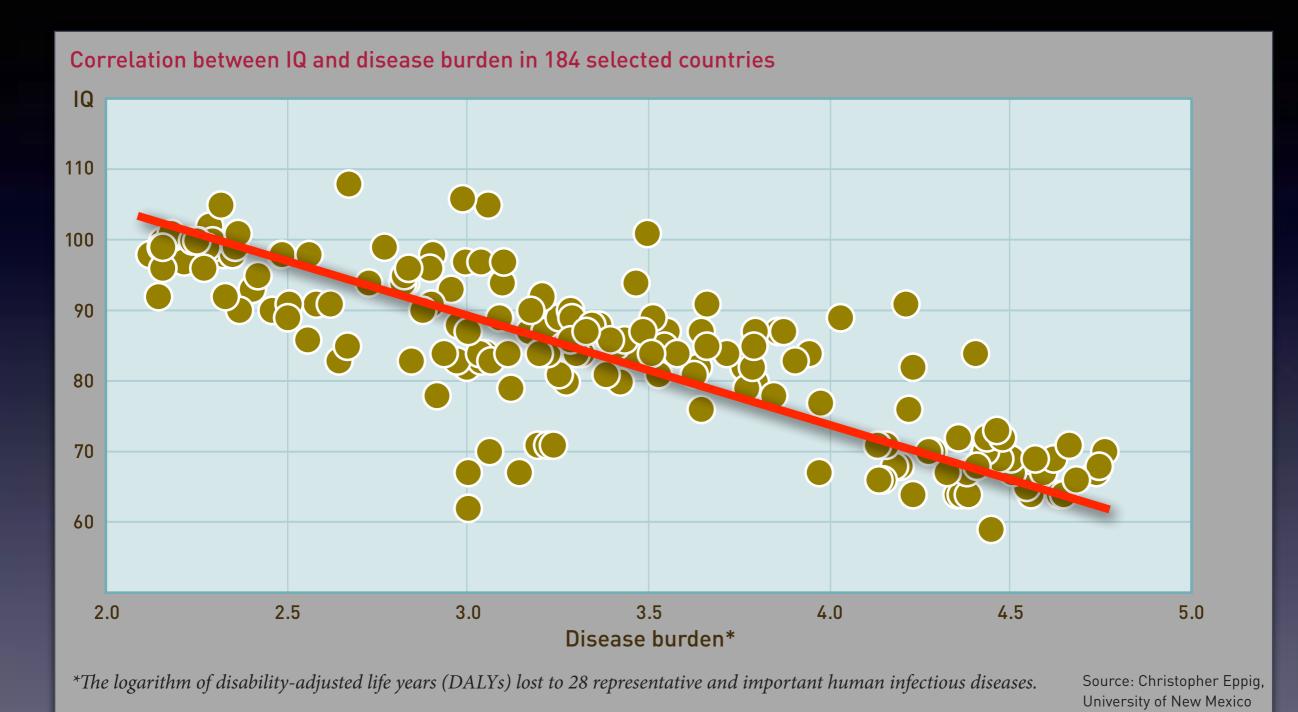


EARLY BRAIN AND CHILD DEVELOPMEN

Both brain architecture and developing abilities are built "from the bottom up" with simple circuits and skills providing the scaffolding for more advanced circuits and skills over time.

EARLY BRAIN AND CHILD DEVELOPMENT

Toxic stress in early childhood is associated with persistent effects on the nervous system and stress hormone systems that can damage developing brain architecture and lead to lifelong problems in learning, behavior and both physical and mental health.



*The logarithm of disability-adjusted life years (DALYs) lost to 28 representative and important human infectious disease.

Source: Unistopher Eppig

Disease burden*



Image from Bruce Perry, MD, PhD, ChildTrauma Academy

THE STRESS RESPONSE:

increases in cortisol and epinephrine



What if it's worse? What if there's no supportive relationships?

Child abuse Parental substance abuse Homelessness

TOXIC STRESS



CHILDHOOD STRESS

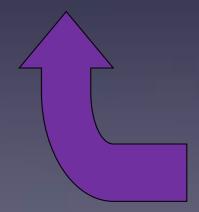


Hyper-responsive stress response

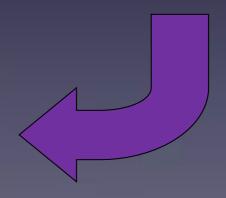
decreased calm/coping

Chronic "fight or flight"

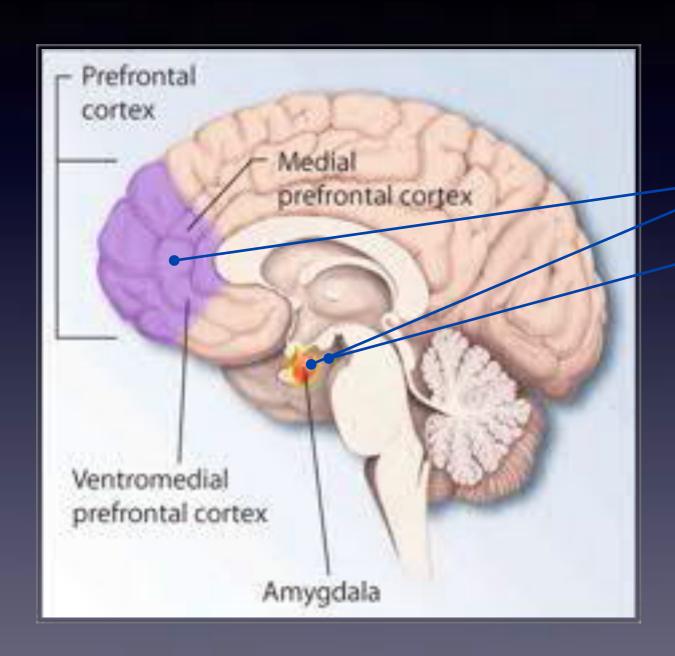
increased cortisol / norepinephrine



Changes in Brain Architecture



What happens?



Prefregtal sortex:

Hippocambus

Hippocambus

Executive: Hippocambus

The first on memory and mood

The first of the street on memory and mood

The first of the street on memory and mood

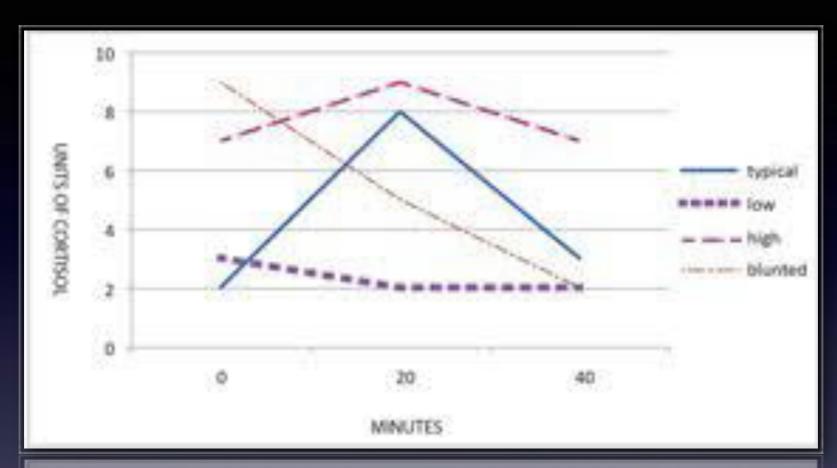
The first of the street on the street of the

ADHD Or Adversity?

Impulsive
Can't plan ahead
Anxious
Can't delay gratification
Labile mood

Poor memory

POVERAD IS NEUROTOXIC



Children with "typical" cortisol response had higher executive function, and were rated as having more self-control in the classroom.

Those with a flat (high or low) or blunted response had well levels of executive function and were rated as having poor self-regulation.

POVERTY IS NEUROTOXIC

Next, children in a large (1200) study whose mothers engaged in "scaffolding" during play found that the children had lower cortisol levels and were more attentive.

Those who were more authoritarian had higher cortisol levels and were found to be less attentive.

This was found at 7 months of age and again at 15 months.

They also found that the more impoverished the family, the less likely they were to engage in scaffolding.

Experience

Protective and Personal (versus Insecure and Impersonal)

Brain Development

Alterations in Brain Structure and Function



Epigenetic Changes

Alterations in the Way the Genetic Program is Read

Behavior

Adaptive or Healthy Coping Skills
(versus Maladaptive or Unhealthy Coping)



THE ADVERSE CHILDHOOD EXPERIENCES STUDY

The Most Important Study You've (Probably) Never Heard Of.

In 1985, Dr Vincent Felitti noticed many patients in his obesity treatment programs had prior history of abuse or trauma

The CDC worked with Kaiser Permanente and looked retrospectively at over 17,000 patients.

This was the first study to simultaneously assess childhood exposure to multiple types of abuse, neglect, domestic violence and serious household dysfunction.

THE ADVERSE CHILDHOOD EXPERIENCES STUDY

Study participants were middle-class Americans from San Diego, 80% white, 74% attended college, average age of 57, split evenly between men and women.

Not exactly an improverished, "at-risk" population.

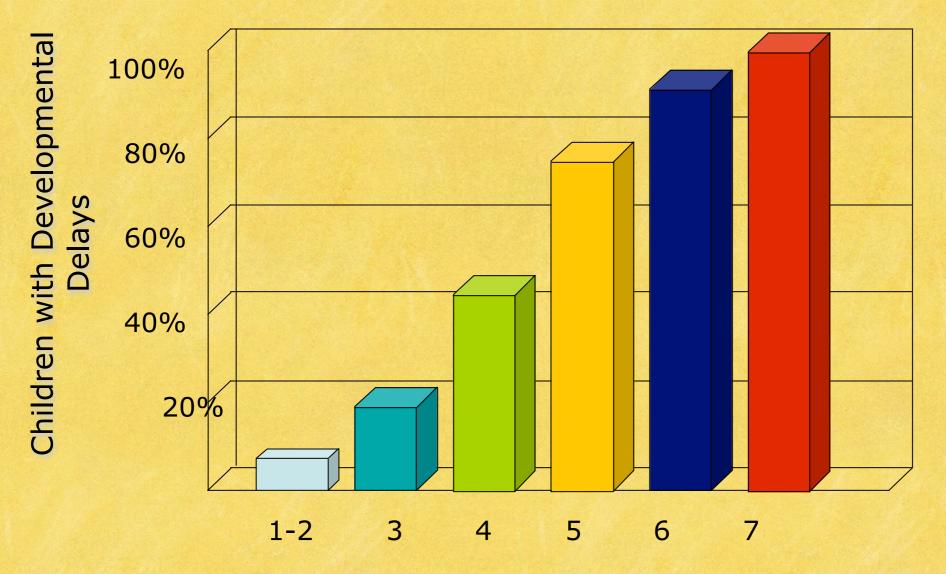
THE ADVERSE CHILDHOOD EXPERIENCES STUDY

Emotional abuse	10%
Physical abuse	26%
Sexual abuse	21%
Emotional neglect	15%
Physical neglect	10%
Mother treated violently	13%
Household substance abuse	28%
Household mental illness	20%
Parental separation or divorce	24%
Incarcerated household member	6%

ACE Score (one point for each category listed)	Prevalence in study
O	33%
1	26%
2	16%
3	10%
4	6%
5	5%
6	6%

Not only are they unexpectedly common... ...their effects are cumulative.

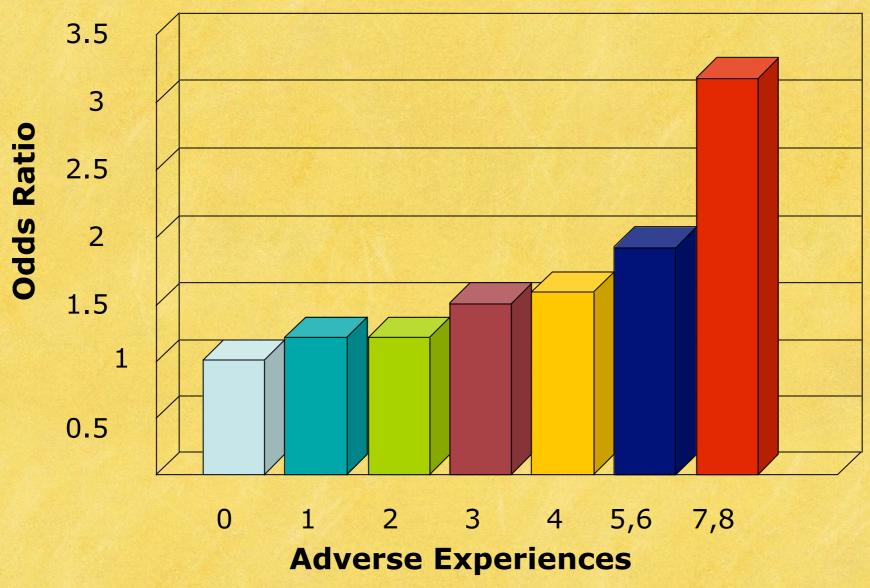
Significant Adversity Impairs Development in the First Three Years



Number of Risk Factors

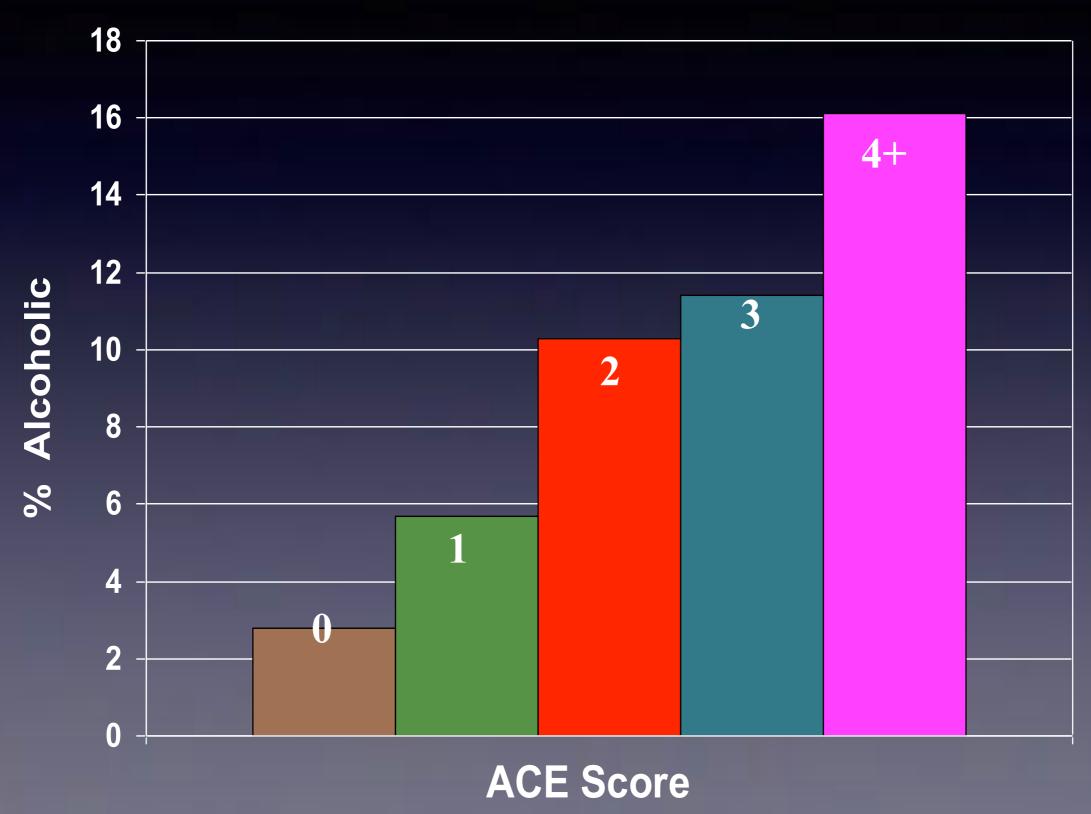
Source: Barth, et al. (2008) via Center on the Developing Child at Harvard University

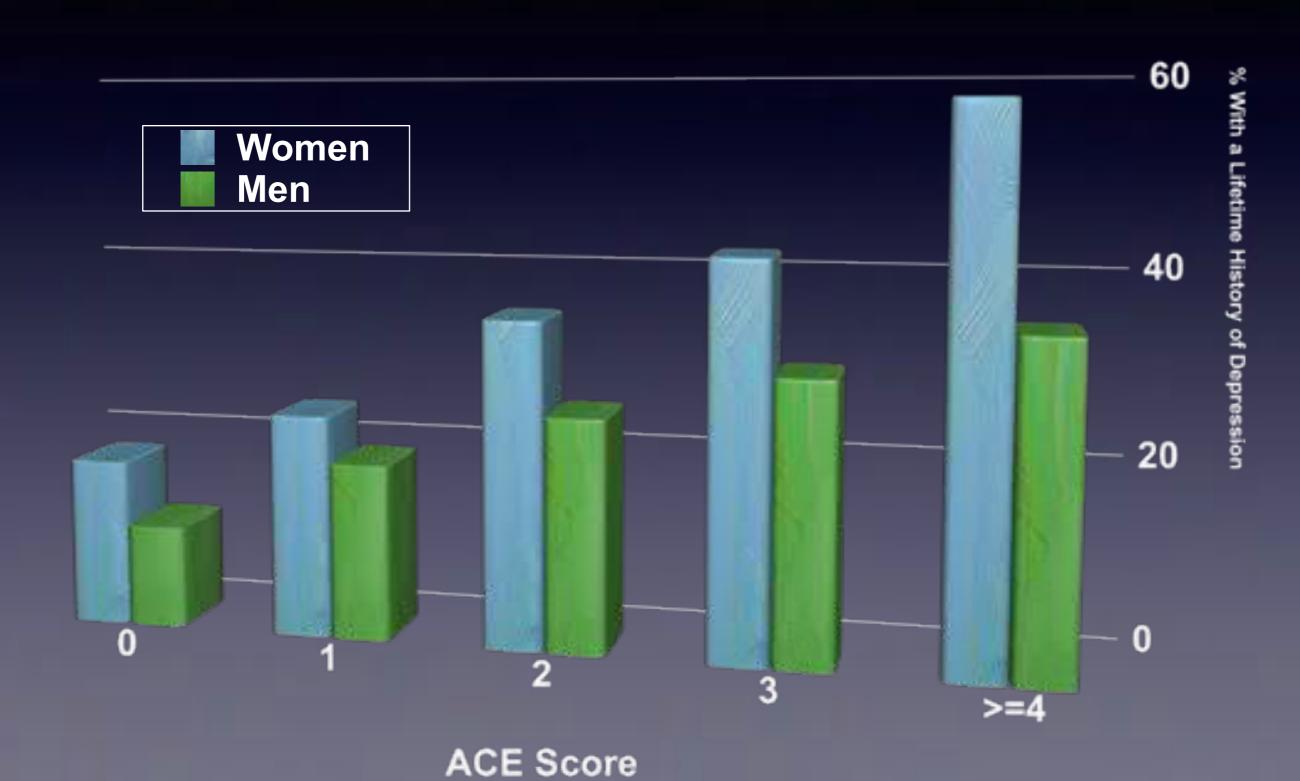
Risk Factors for Adult Heart Disease are Embedded in Adverse Childhood Experiences



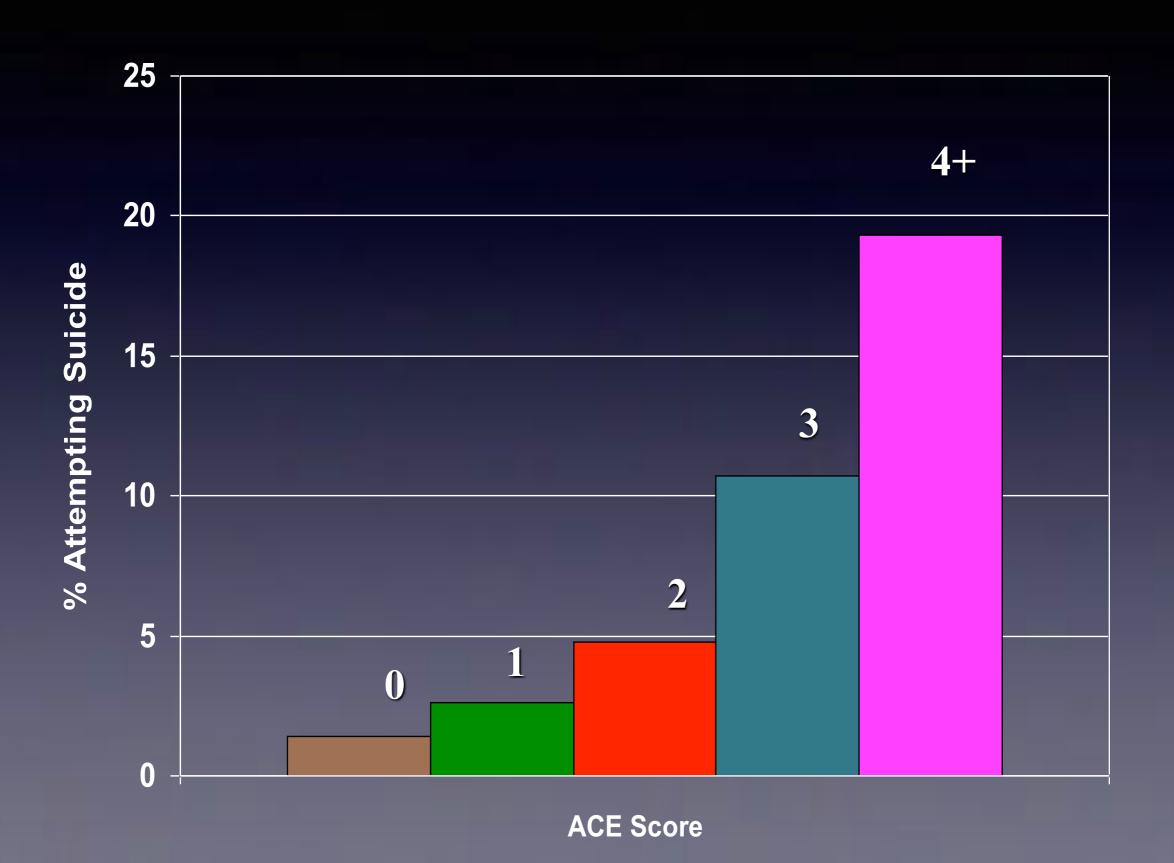
Source: Dong, et al. (2004) via Center on the Developing Child at Harvard University

Childhood Experiences vs. Adult Alcoholism

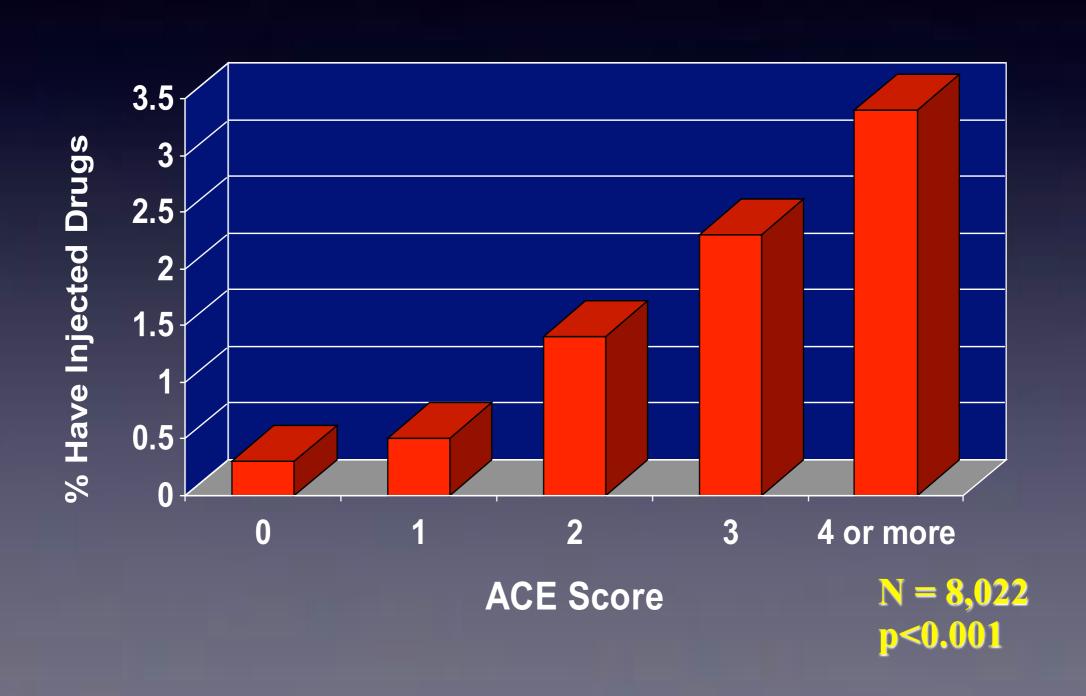




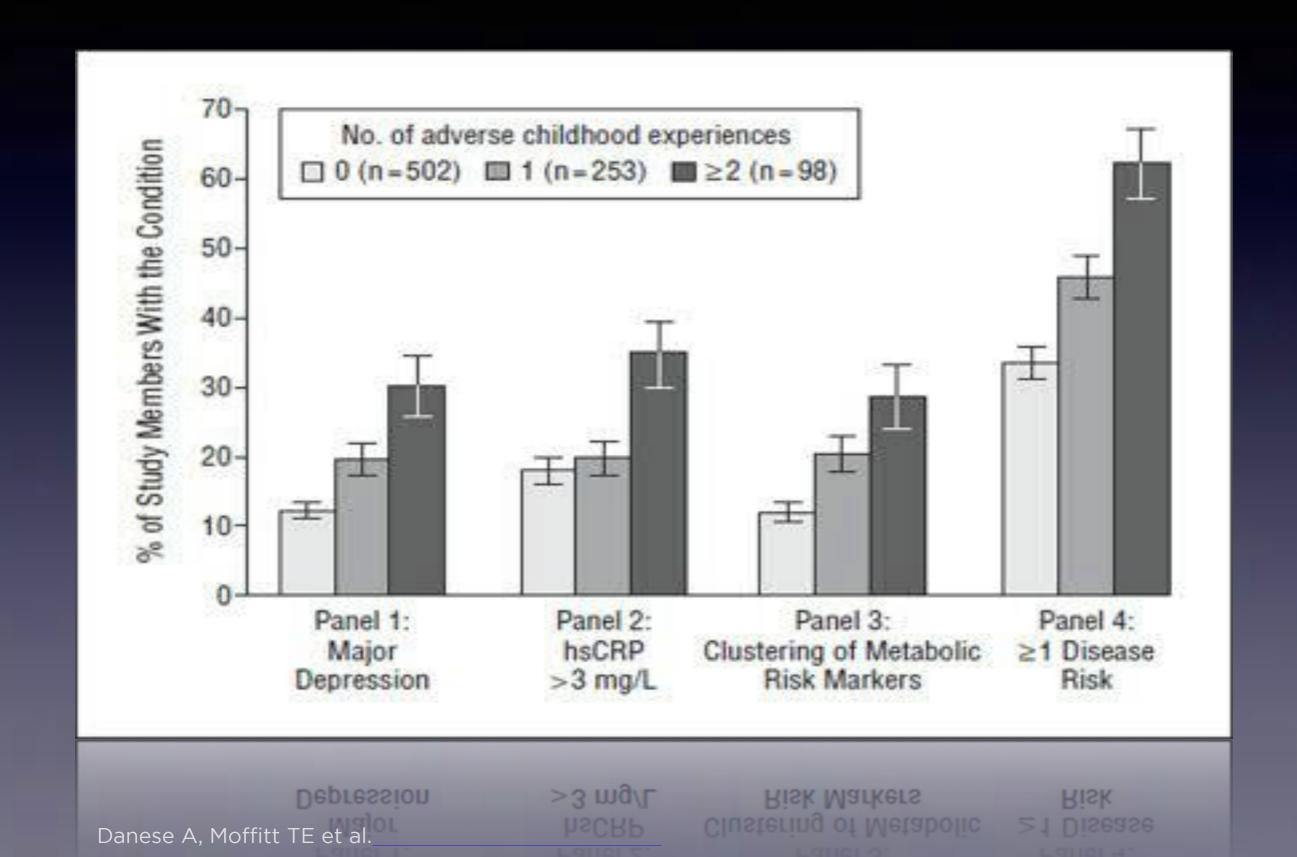
SUICIDE ATTEMPTS



IV DRUG USE

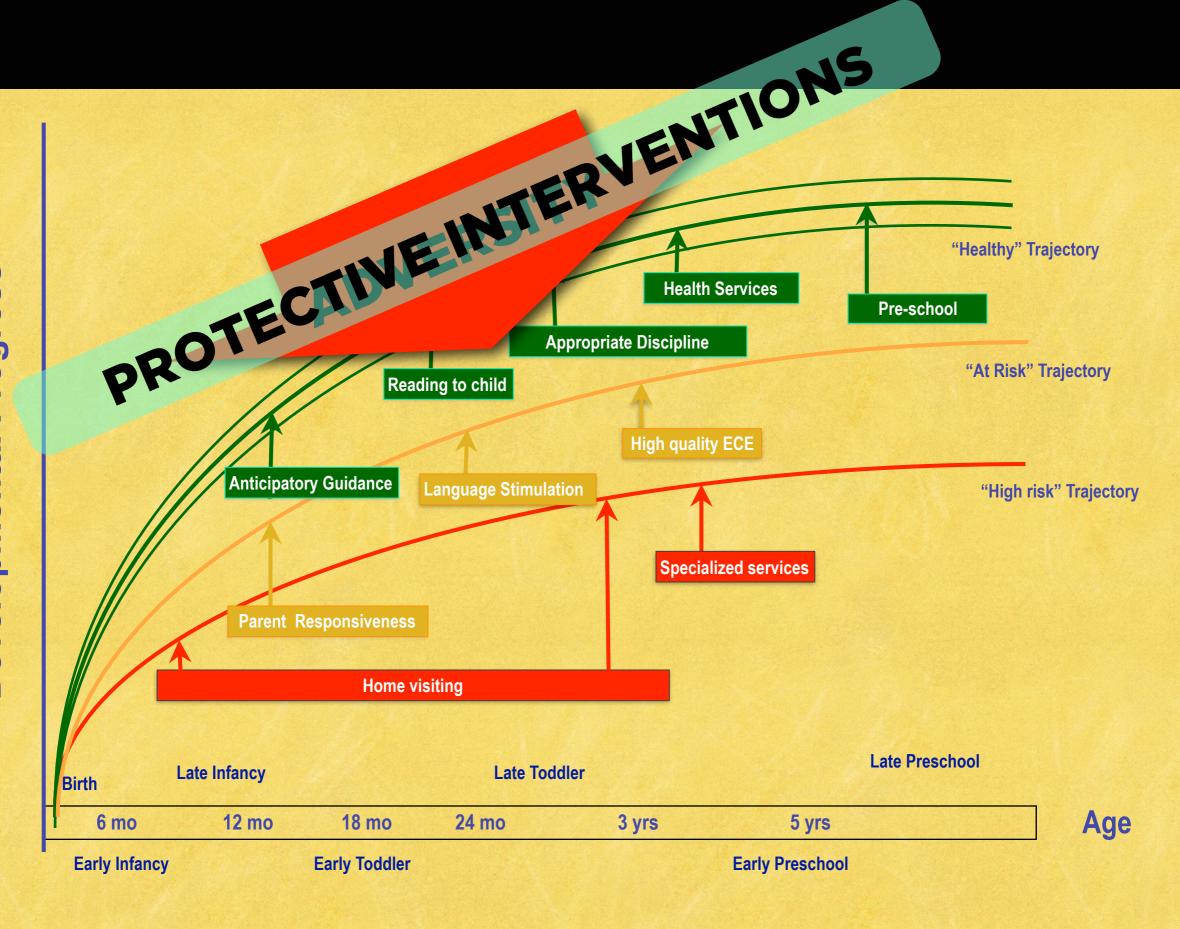


EVEN SMALL INCREASES IN ACES...



EARLY BRAIN AND CHILD DEVELOPMENT

Creating the right conditions for early childhood development is likely to be more effective and less costly than addressing problems at a later age.

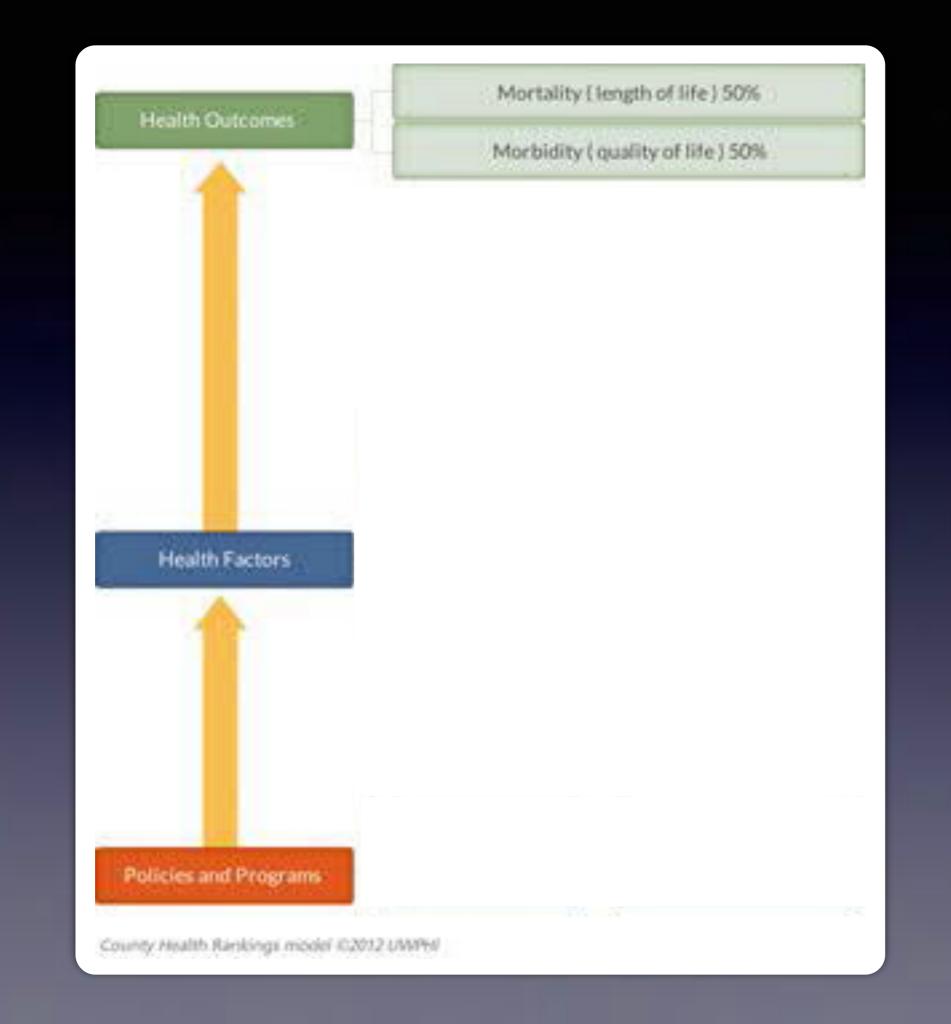


Three Promising Domains for EBCD Innovation Jack Shonkoff, MD

Reduce emotional and behavioral barriers to learning.

Enhance the healthy development of children by transforming the lives of their parents.

Reconceptualize the health dimension of early childhood policy and practice.



The Brave New World of Pediatrics:

DEVELOPMENTAL ASSURANCE

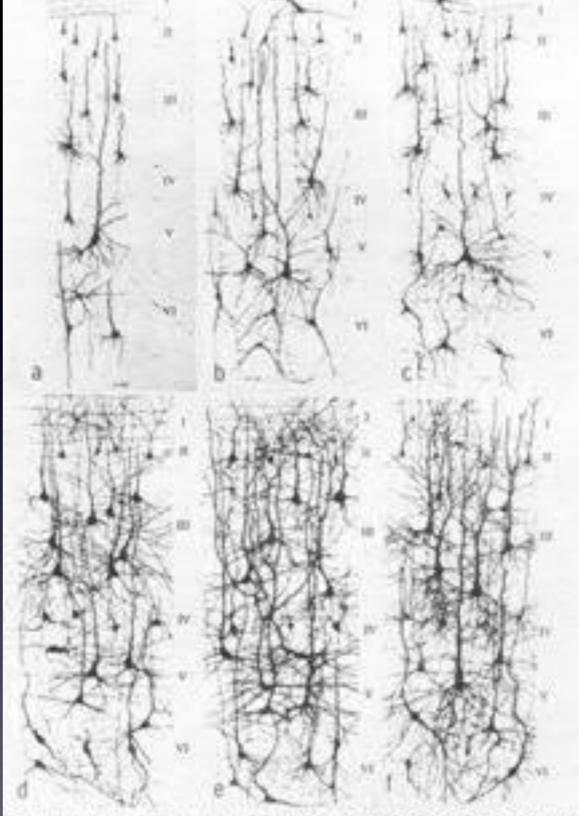
Building a healthy mind, brain and body for social purpose.

NONE OF THIS IS TO SAY...

...that children should be engaged constantly
...that "bad things" are necessarily a long-term negative
...that children should not be appropriately disciplined

FIVE NUMBERS TO REMEMBER

700 New Neural Connections per Second



Postnatal development of human cerebral cortex around Broca's Area (FCBm); camera lucida drawings from Golgi-Cox preparations. a: newborn; b: 1 month; c: 3 months; d: 6 months; e: 15 months; t: 24 months.

(from Conet, 1939-1959)

(If OILL COHEL, 1909-1909)

PLASTICITY

Synaptic

Variation in Strength of connections

"A whisper to a shout"

Lifelong

Cellular

Variation in Number of Connections

"One shout to a stadium shouting."

Declining by age 5!

Diminishing Cellular Plasticity Limits Remediation

18 Months:

Sampling Experience

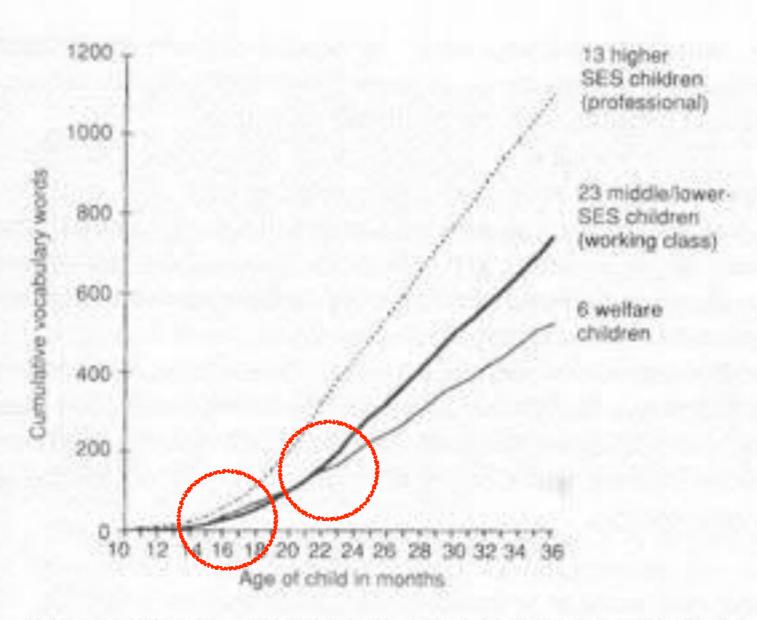
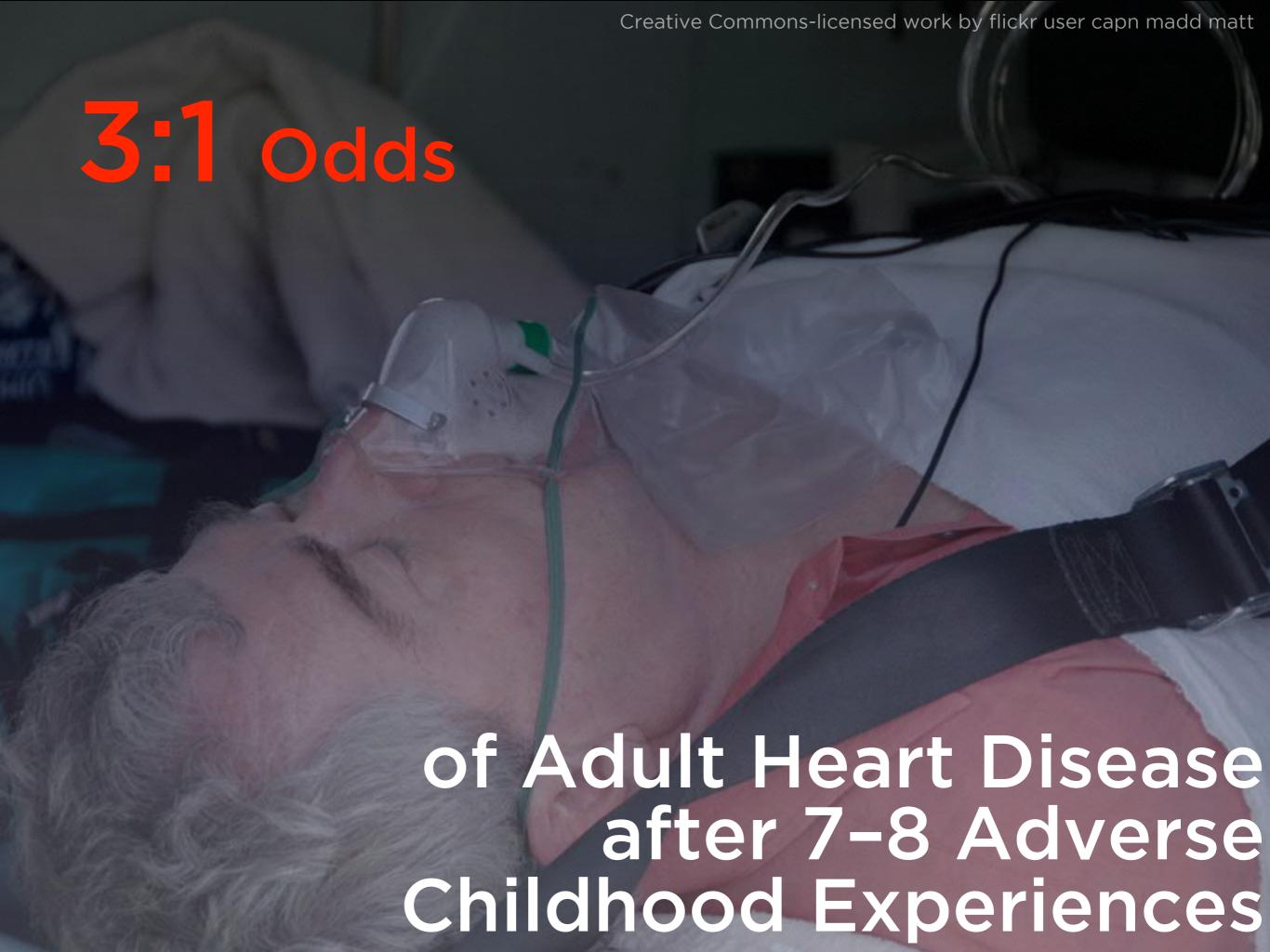
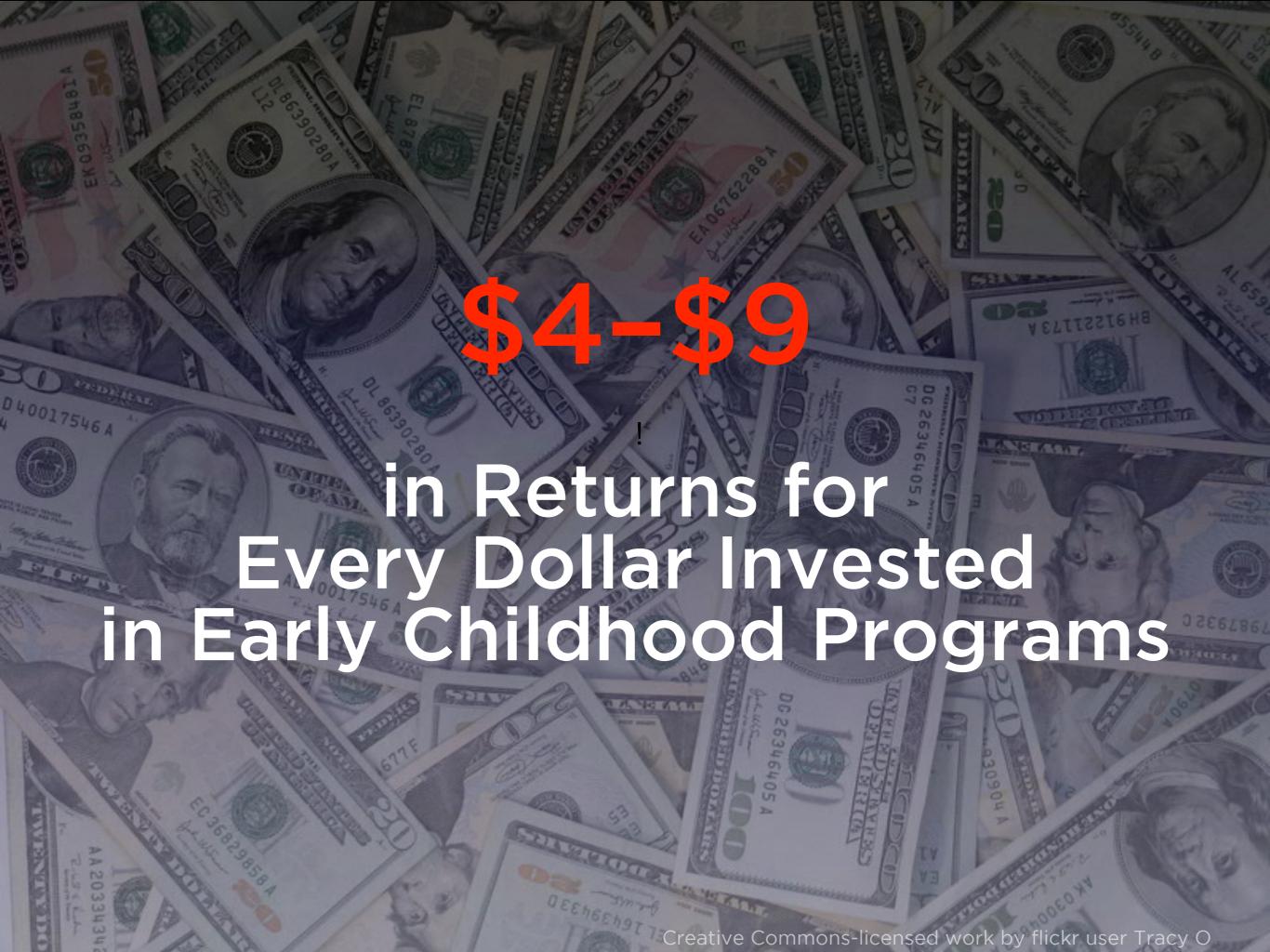
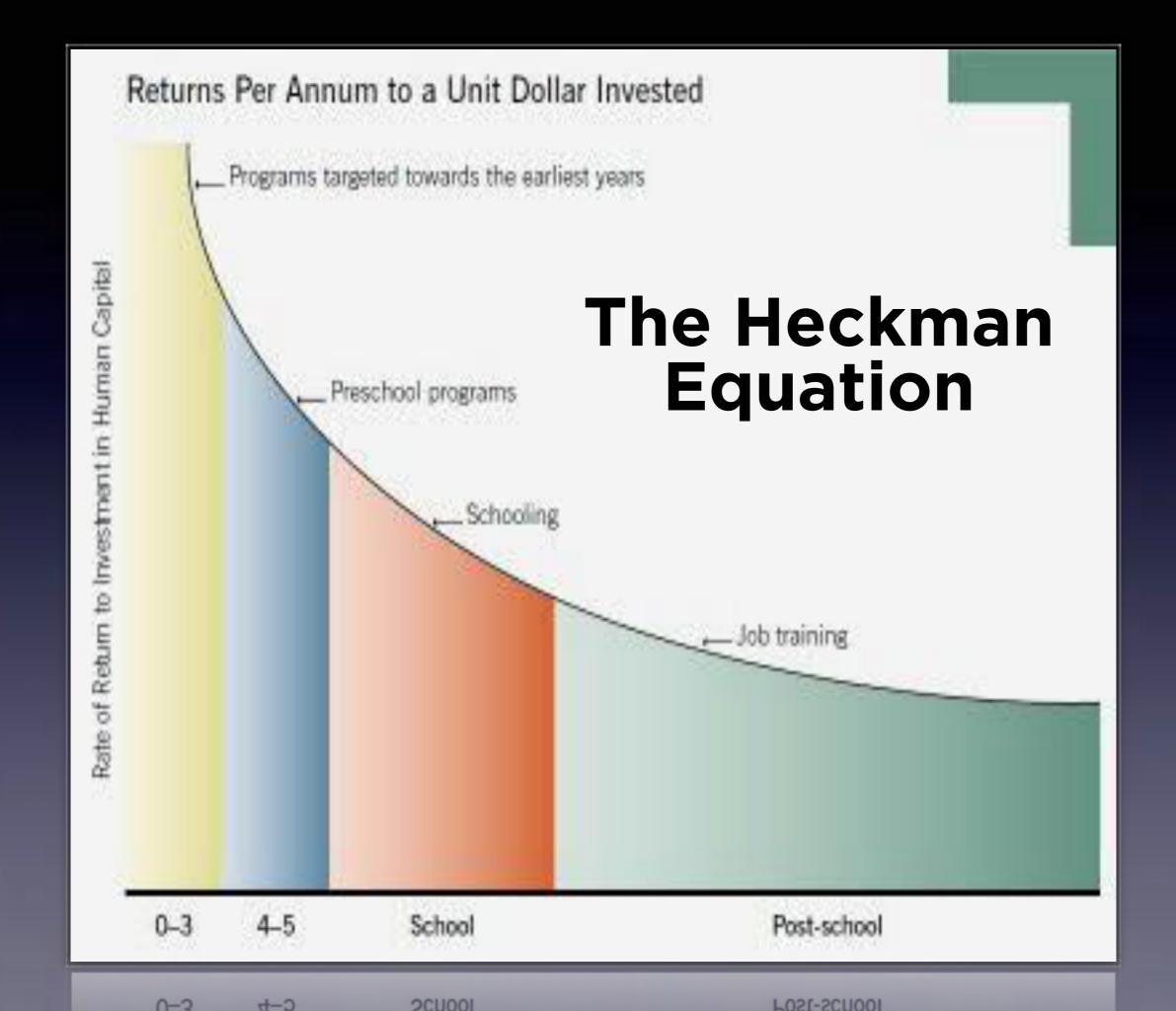


Figure 2. The widening gap we saw in the vocabulary growth of children from professional, working-class, and welfare families across their first 3 years of life. (See Appendix B for a detailed explanation of this figure.)



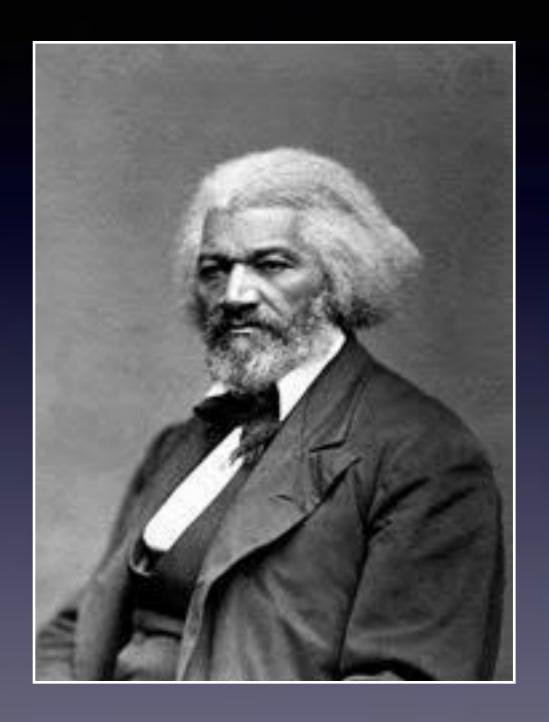






"It is easier to build strong children than to repair broken men."

> - Frederick Douglass (1817-1895)



What can we do about it?

Principles of THE SOILITIONS

We need solutions which...

Build capabilities

Build capacities

Are based in homes & communities

Address root causes

Have long-term effects

Address prevention

Leverage the first 1000 days

Are evidence-guided

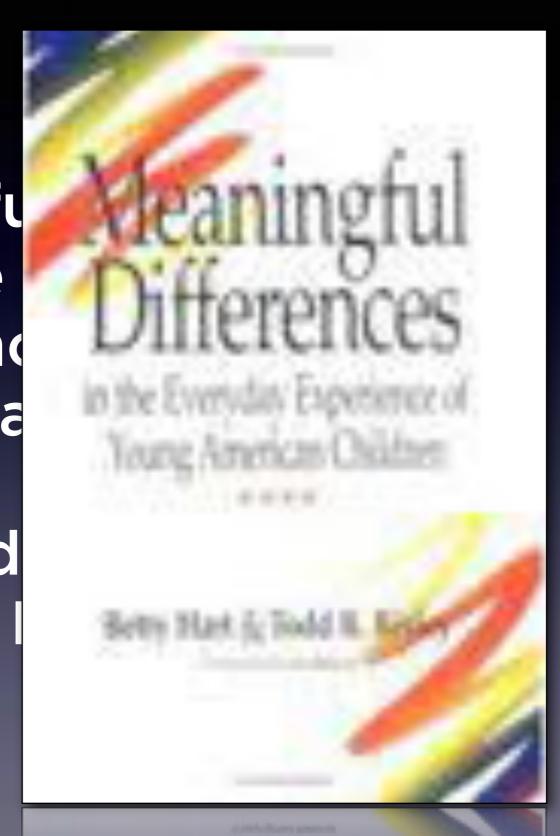
Are scalable

Dart Turn

Reading Reality

Meaningfu in the Experience America

> Todd Betty I



Children from low-income families hear as many as million fewer words than their more affluent peers before the age of 4.

Low-income children are at a disadvantage before school begins

A TYPICAL MIDDLE-CLASS 5-YEAR-OLD IS ABLE TO IDENTIFY 22 LETTERS AND SOUNDS OF THE ALPHABET, COMPARED TO JUST 9 LETTERS FOR A CHILD FROM A LOW-INCOME FAMILY.

(WORDEN AND BOETTCHER, 1990; EHRI AND ROBERTS, 2006)

ABCDEFGHIJKLMNOPQRSTUV WXXYZ

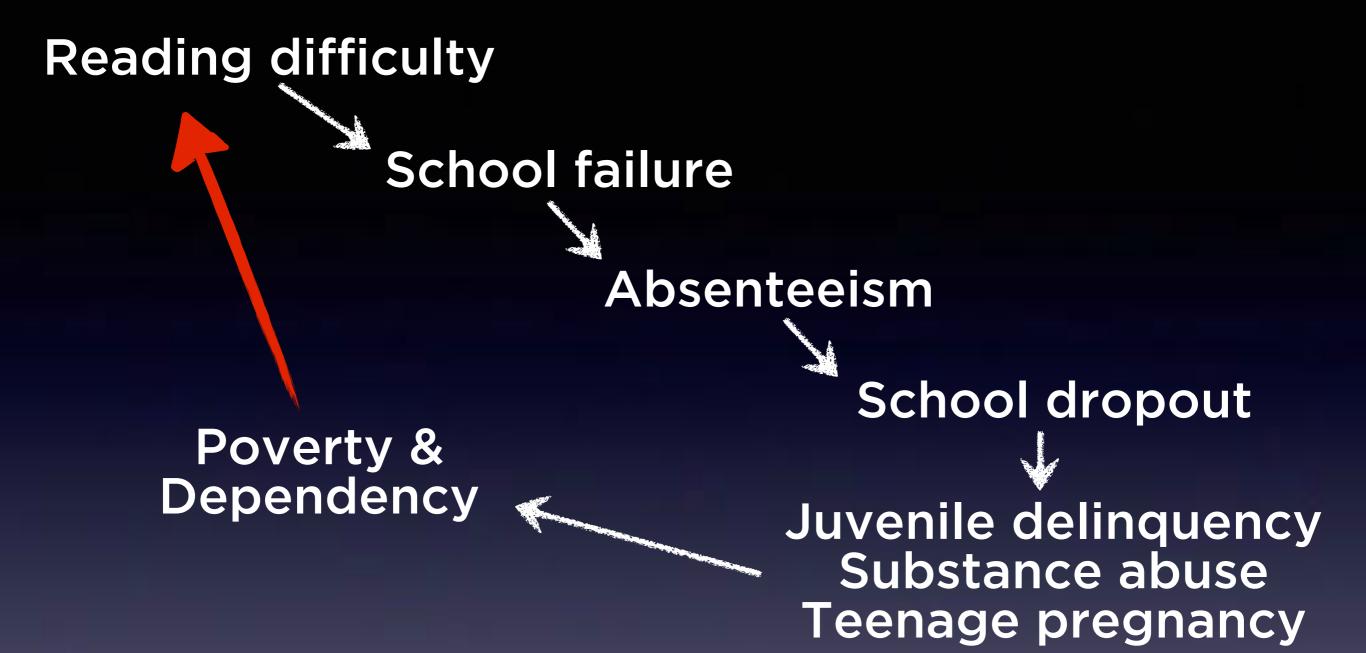
MIDDLE-INCOME CHILD'S LETTER RECOGNITION (22 LETTERS)

ABCDEFGHI JKLMNOP QRSTUVWXYZ

LOW-INCOME CHILD'S LETTER RECOGNITION (9 LETTERS)

LOW-INCOME CHILD'S LETTER RECOGNITION (9 LETTERS)





School intervention is too late.

Innate interest in learning and curiosity can be irreparably damaged if reading is not enjoyable at an early age.

America's Cradleto-Prison Pipeline: A Report of the Children's Defense Fund, October 2007

Mississippi State Senator Willie Simmons [...] said that the state of Mississippi once used **Selementary school achievement scores to project future prison population**. In 1992 [he] was the deputy commissioner of Mississippi's Department of Corrections [which] commissioned a study to project what the state's prison population [...] would be in 10 years.

"The group in Washington that did the study looked at three factors," he said. "The first was our sentencing laws; the second was the crimes that were being committed. The third factor, the key factor, was the reading and math scores in the fourth, fifth, and sixth grades." The projection of 21,000 beds proved to be very accurate...



Why Reading?

Reading is the fundamental skill for learning

Understanding of printed words and what they represent

Awareness of books

Emergent Literacy:

the early display of an awareness by children that print conveys information. It is an amalgamation of children's oral language development and their initial attempts at reading and writing. Such attempts include "reading" the pictures of a book, or scribbling. Emergent literacy, if supported by meaningful interaction in oral and written language, evolves into full literacy skills. (Teale & Sulzby, 1986)



"Middle Kingdom" or... China!



Awareness of books

Using background knowledge and strategies to obtain meaning from print





Awareness of books

Using background knowledge and strategies to obtain meaning from print

Fluent reading

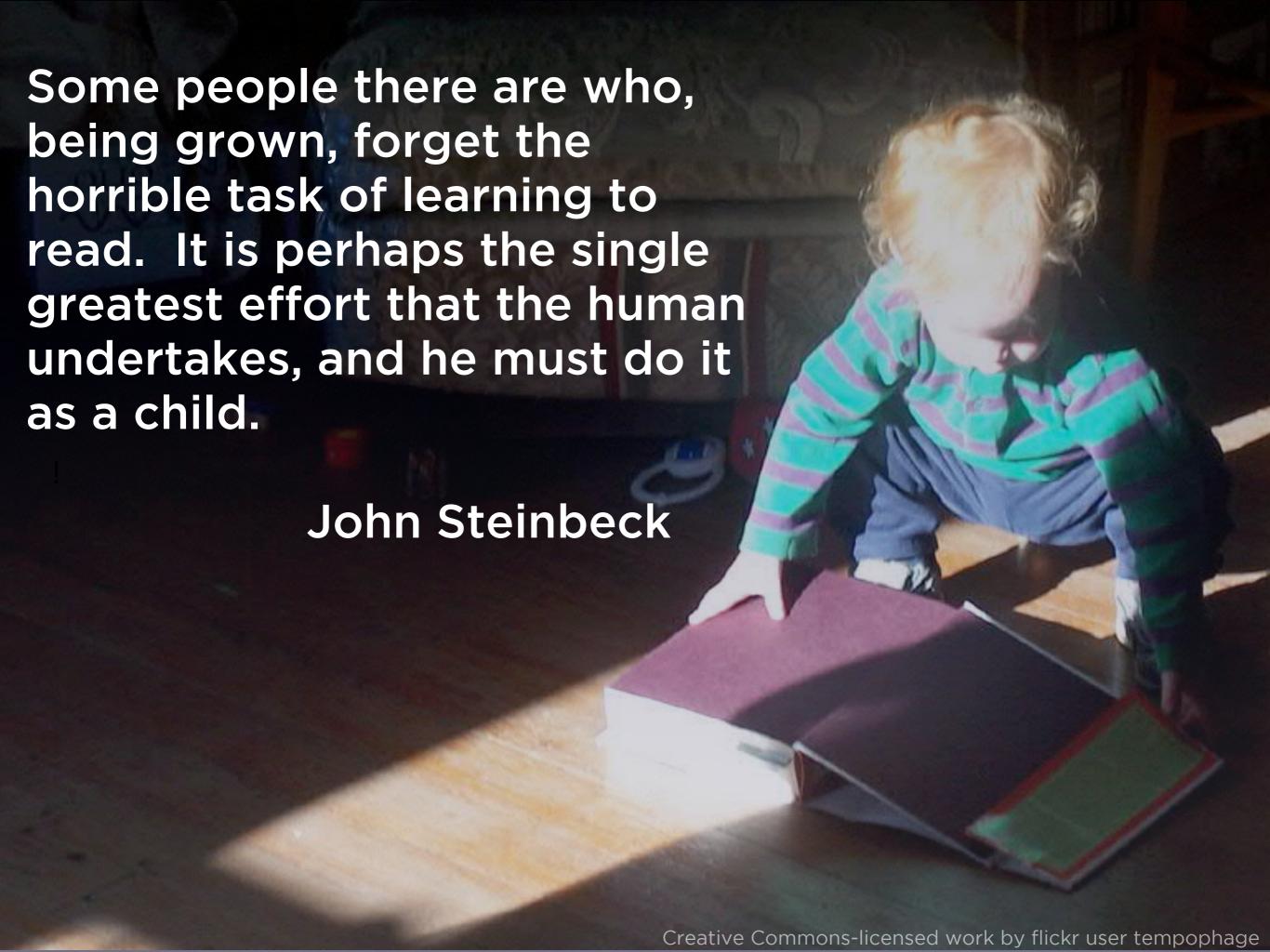
Dialogic Reading:

The act of reading becomes a conversation between the adult and the child; the adult helps the child become the teller of the story by becoming the listener, questioner, and audience for the child.

Reading to children may not be a natural skill for adults.

Reading at all may not be something an adult is capable of.

Reading problems may have been an issue for generations.



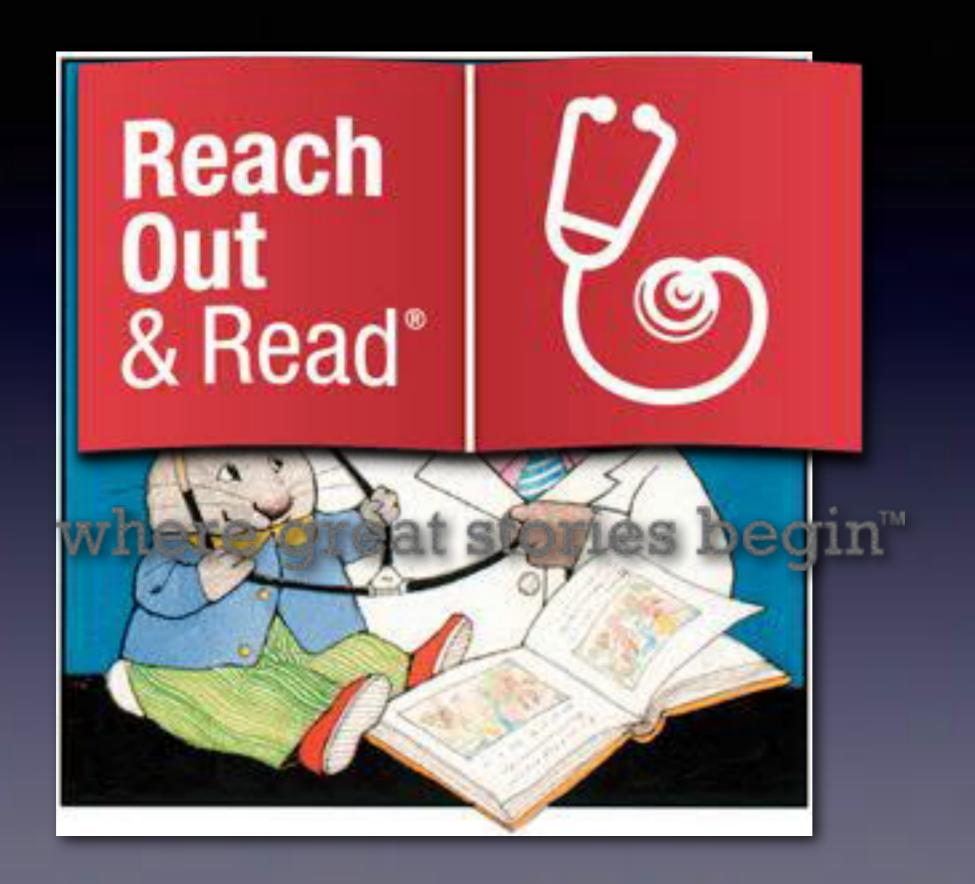
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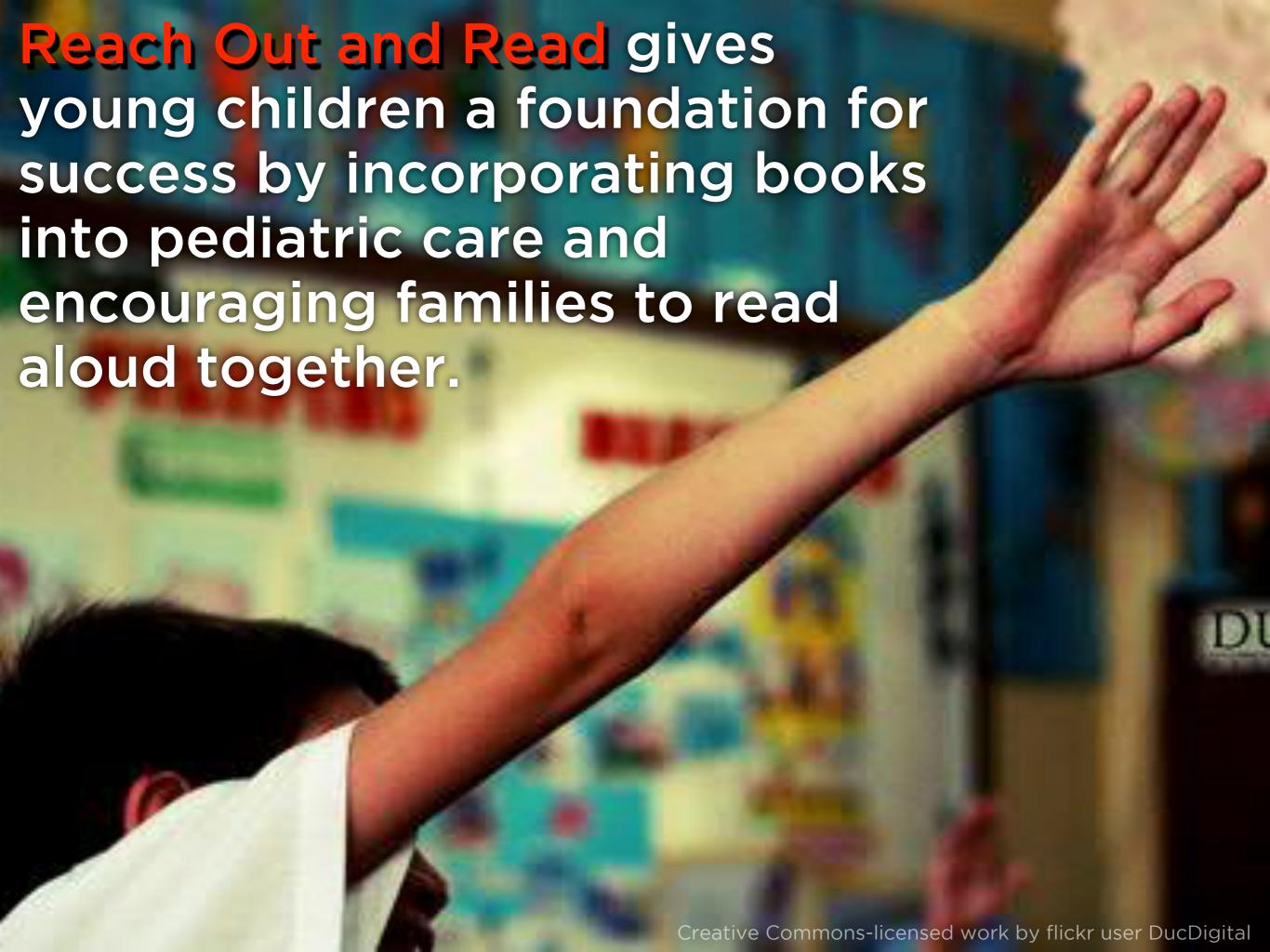
- Perri Klass, MD
- Perri Klass, MD

Reading should be fun!

Part Inree

Reach Out and Read



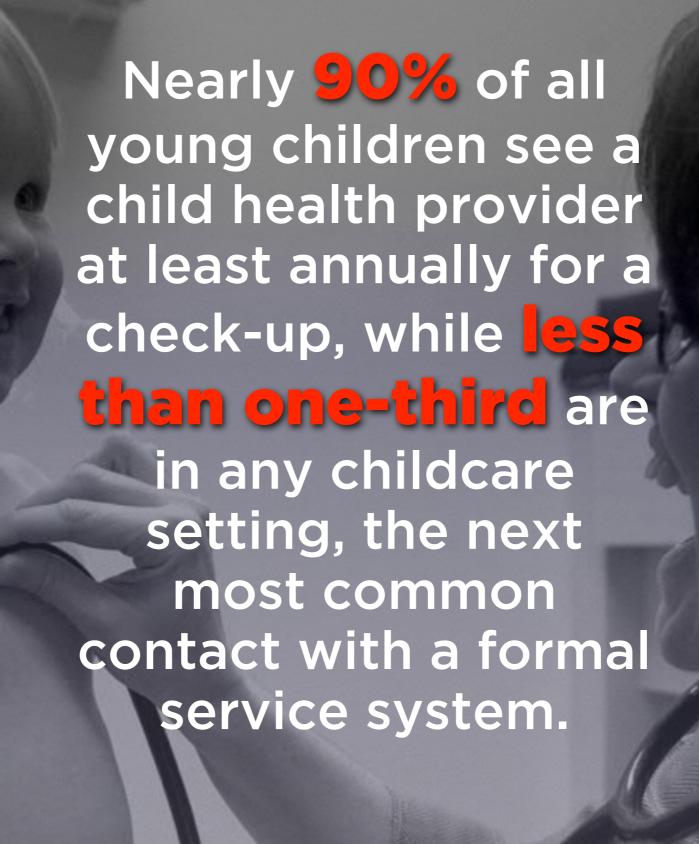


Prescription for Reading

Name:	8		
Date:_	Age:		
	R	Read Books	
		☐ For minutes every day	
		☐ As needed	
	Refills:	as requested at local public library	
Signatu	re:		223
	D	ipesh Navsaria, MPH, MSLIS, MD	
	Pe	diatrician & Occasional Children's Librarian	

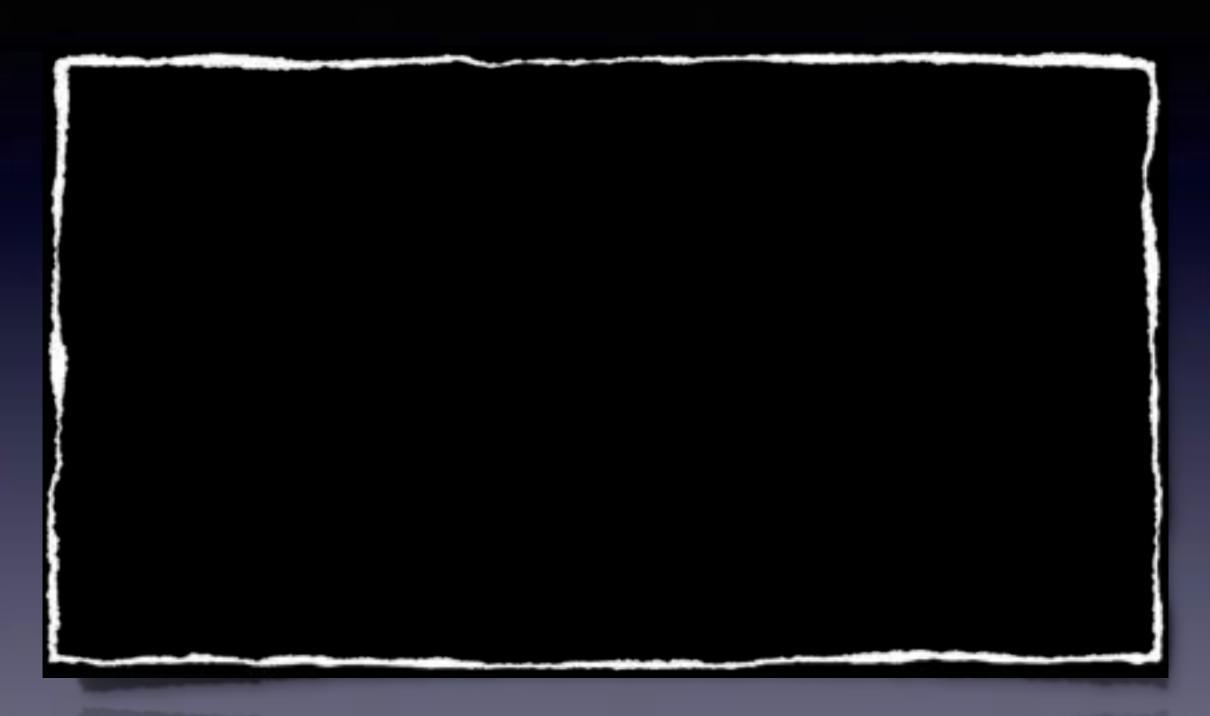
Families: Please visit reading.pediatrics.wisc.edu for more information on the joy of sharing books together and how it can make a huge difference in your child's life.

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Charles Bruner, writing in The Colorado Trust's Issue Brief: Connecting Child Health and School Readiness,
February 2009

Nyla



12-15 months

Constant, happy babble: exposed to language & books

Calms and tunes to Dad when she reads

Eagerly
explores book
with every at Color book and turns
hands/Mouth at Color book and turns
hands/Mouth at Color book and turns

Allows Nyla control of book

Encouraged not to give up

Secribes enjoyment of quality time; notice joint attention

Parent

Points to objects to engage and teach



OWIII/TDMFC THE ELEPHANT IN THE CLINIC

EARLY LITERACY AND FAMILY WELL-BEING



DIPESH NAVSARIA, MPH, MSLIS, MD AMY SHRIVER, MD









Change the First Five Years and You Change Everything

Ounce of Prevention Fund

"While schools can do much to raise achievement among children who initially lag behind their peers, all too often pre-school gaps set in train a pattern of ever increasing inequality during school years and beyond. Any drive to improve social mobility must begin with an effective strategy to nurture the fledgling talent in young children so often lost before it has had a chance to flourish."

The Sutton Trust



